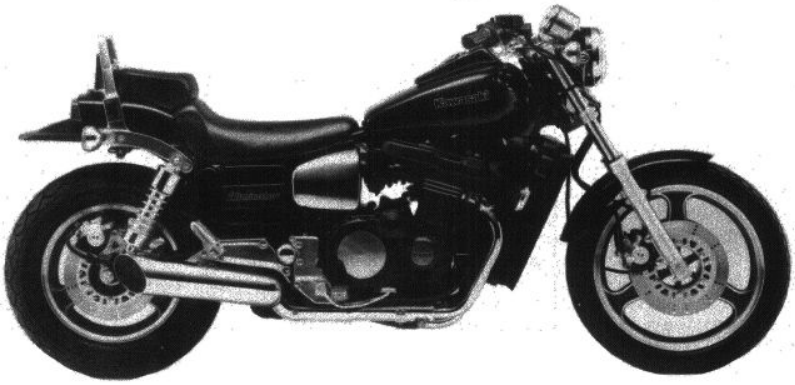
Kawasaki

ZL900
ZL1000

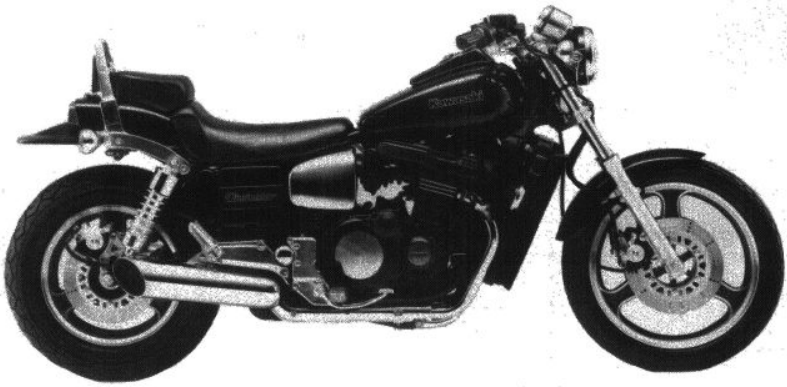
Motorcycle Service Manual Supplement

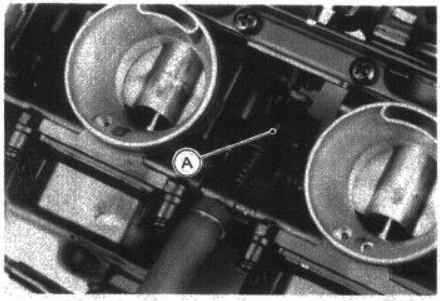
Model Identification

ZL900-A1 Right Side View:



***ZL900-A2 Right Side View:**



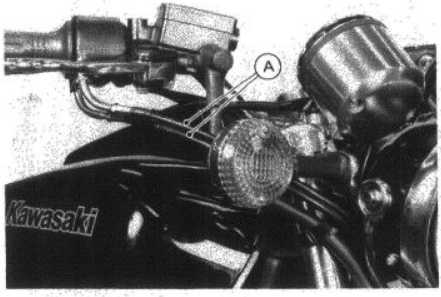


A. Adjusting Screw

★If the throttle cables can not be adjusted by using the cable adjusting nuts at the upper end of the throttle cables, use the cable adjusters at the lower ends of the throttle cables. Do not forget to securely tighten the adjuster mounting nuts.
●Start the engine.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the throttle cable may be poorly routed or it may be damaged.
●Correct any problem before operating the motorcycle.

WARNING

○Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.

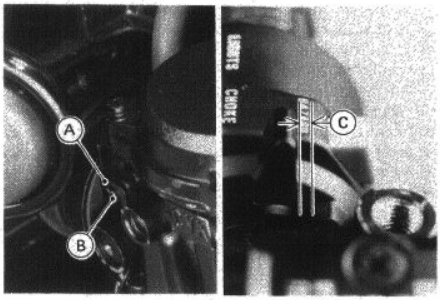


A. Throttle Cables

Choke Cable

Choke Cable Free Play Inspection

●Push the choke lever back all the way to its released position.
●Pull the choke lever back until starter plunger lever engages with the starter plunger on the carburetor. The amount of lever travel is the amount of choke cable free play.



A. Starter Plunger Lever
B. Starter Plunger
C. Free Play

★If free play is not correct, adjust the choke cable.

Choke Cable Free Play
2 ~ 3 mm

Carburetors

Idle Speed Inspection

The following specifications are only those that are unique to the ZL900 model. For all other data refer to the base manual.

Idle Speed
1,000 ±50 r/min (rpm)
(Californian model: 1,200 ±50 r/min (rpm))

Fuel Tank

Fuel Tank Removal

●Open the seat.
●Unscrew the mounting bolts from the rear end and both sides of the tank.

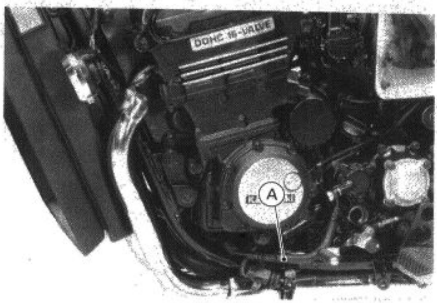
Engine Top End

Table of Contents

Clutch Pipe

Clutch Pipe Installation Note

- Route the clutch pipe as shown.
- Tighten the banjo bolts and the pipe joint to the specified torque (see Exploded View).



A. Clutch Pipe

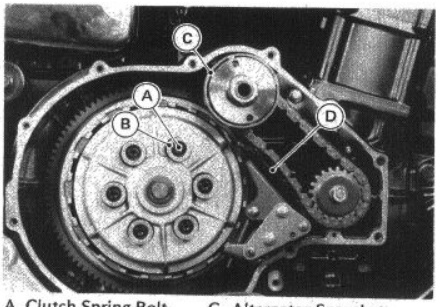
Clutch

Clutch Removal

NOTE

○*It is not necessary to remove the alternator sprocket and the chain tensioner for clutch removal.*

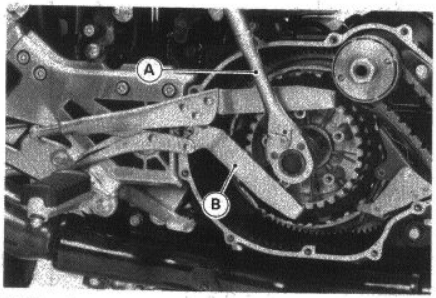
- Remove the right engine cover.
- Remove the clutch spring bolts, retainers and springs.
- Remove the spring palte with the spring plate pusher.
- Remove the friction plates and steel plates.



A. Clutch Spring Bolt
B. Retainer
C. Alternator Sprocket
D. Chain Tensioner

- When loosening the clutch hub self-locking nut, use the holder (special tool) to keep the clutch hub from turning as shown in the figure below.

○Turn the wrench counterclockwise slowly.

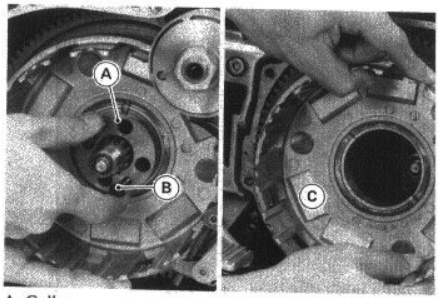


A. Wrench
B. Holder: 57001-305

- Pull out the sleeve, thrust washer, clutch housing, clutch housing bearing collar, oil pump driven gear, and spacer.

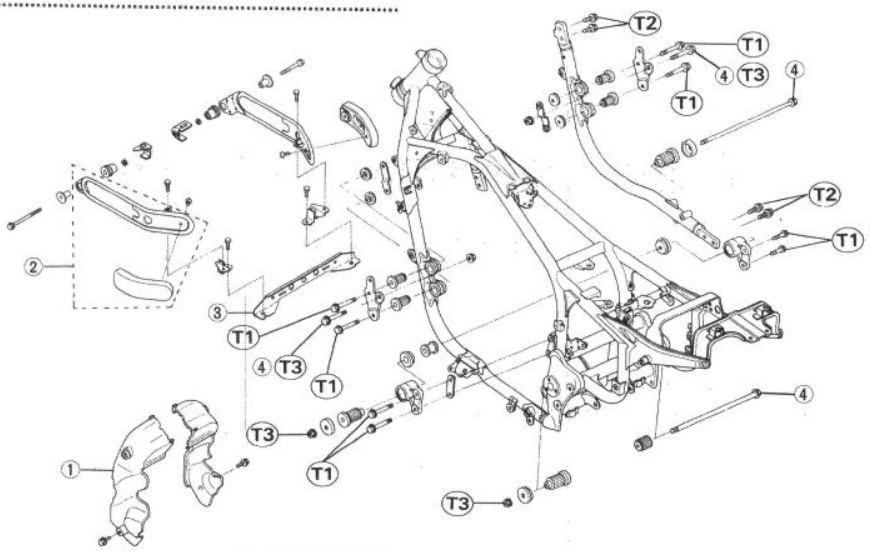
○The clutch housing bearing collar can easily be removed by installing right engine cover bolts into the collar holes and pulling them.

○The clutch housing can be removed after removing the bearing collar.



A. Collar
B. Right Engine Cover Bolt
C. Clutch Housing

Exploded View



1. Air Baffle Cover
2. Knee Pad
3. Bracket
4. Engine Mounting Bolt

T1: 25 N-m (2.6 kg-m, 19 ft-lb)
T2: 32 N-m (3.3 kg-m, 24 ft-lb)
T3: 34 N-m (3.5 kg-m, 25 ft-lb)

Engine Removal/Installation

Engine Removal

- Position the motorcycle across a hoist to lift the rear wheel off the floor.
- Drain the engine oil (see Engine Oil Change in the Engine Lubrication System chapter).
- Drain the coolant (see Coolant Change in the Cooling System chapter).
- Remove the following:
  - Seat
  - Fuel Tank
  - Radiator
  - Propeller shaft
  - Water Pump and Hoses
  - Mufflers and Exhaust Pipes
  - Air Baffle Cover
  - Ignition Coils
  - Vacuum Switch Valve (US model) and Hoses
  - Carburetors
  - Air Cleaner Housing
  - Rear Master Cylinder Cover
- Disconnect wiring from the engine components, and free them from any clamps.
  - Horn Lead (right side only)
  - Starter Motor Lead
  - Neutral Switch Wire
  - Oil Pressure Switch Wire
  - Oil Temperature Switch Wire
  - Battery Ground Lead
- Unscrew the mounting bolts, and remove the knee pad from the bracket.
- Remove the engine mounting bolts. Support the engine before sliding out the engine mounting bolts.
- Remove the down tube with horn (right side only).
- Remove the engine.

Engine Installation

- Engine installation is the reverse of removal. Note the following.
- Tighten the engine mounting bolts to the specified torque (see Exploded View).
- Fill the engine with engine oil (see Engine Oil Change in the Engine Lubrication System chapter).
- Fill the engine with coolant (see Coolant Change in the Cooling System chapter).
- Adjust the following.
  - Throttle Cable
  - Choke Lever

Tire Air Pressure (when cold)

Front: 225 kPa (2.25 kg/cm², 33 psi)
Rear: 280 kPa (2.80 kg/cm², 40 psi)

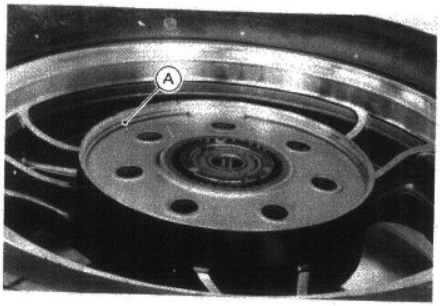
Hub Bearings

Rear Hub Bearing Removal

CAUTION

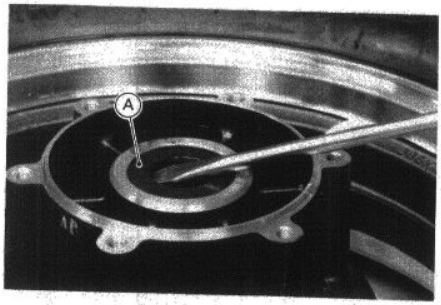
○**Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so the disc does not touch the ground.**

- Remove the rear wheel.
- Remove the retaining ring, and remove the coupling.
- Remove the disc mounting Allen bolts and take off the disc.



A. Retaining Ring

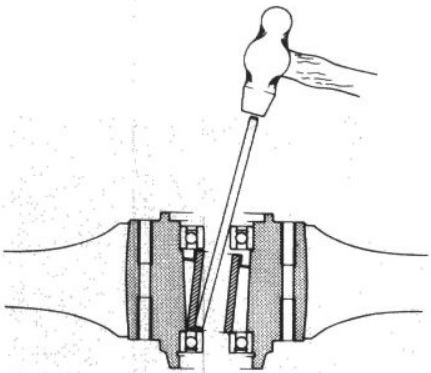
- Remove the grease seal using a hook, and remove the circlip.



A. Grease Seal

- Insert a metal rod into the hub from the left side, and remove the right side bearing by tapping evenly around the bearing inner race.
- Remove the remaining bearing by tapping evenly around the bearing inner race. The distance collar comes out with the bearing.

Bearing Removal



Rear Hub Bearing Installation

- When installating the rear hub, be careful of the following items.

○Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.

○When any of the parts listed below are replaced with new ones.
Tapered Roller Bearings
Bevel Gears
Bearing Housing
Pinion Gear Joint

○When the pinion gear nut is loosened, even if the purpose is not to replace the parts.

●Assemble the pinion gear bearing housing, and tighten the pinion gear nut to the specified torque. Oil seal installation is not required until the correct bearing preload is obtained.

CAUTION

○**To start with, choose a shim or shims so that the bearings are just SNUG with NO play but also with NO preload.**

○**Any over-preload on the bearings could damage the bearings.**

●Apply a little final gear case oil to the bearings, and turn the gear shaft more than 5 turns to allow the bearings to seat.

●Measure the bearing preload. Bearing preload is defined as the force or torque which is needed to start the gear shaft turning.

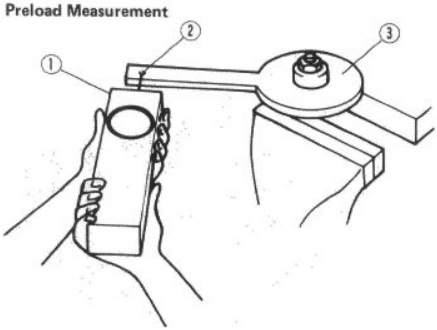
NOTE

○*Preload can be measured either with a spring scale or a beam-type torque wrench. When measured with a spring scale, the preload is designated by force (N, kg), and when measured with a torque wrench, it is designated by torque (N-m, kg-m, in-lb).*

Using Spring Scale:

Hook the spring scale on the handle at the point 200 mm from the center of the gear shaft. Hold the bearing housing in a vise so that the gear shaft axis is vertical. Apply force to the handle horizontally and at a right angle to it.

Preload Measurement

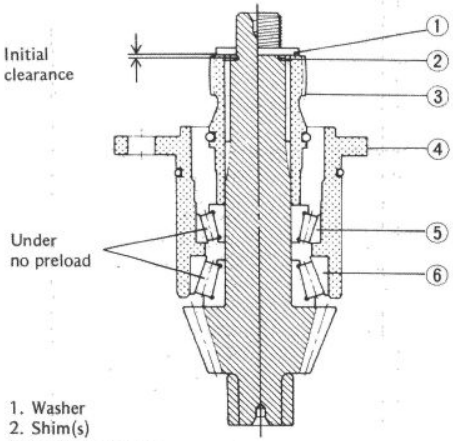


1. Spring Scale
2. Hole
3. Pinion Gear Holder: 57001-1165

★If the preload is out of the specified range, replace the shims under the flat washer, and re-check the preload. Refer to the next paragraph to select suitable shims.

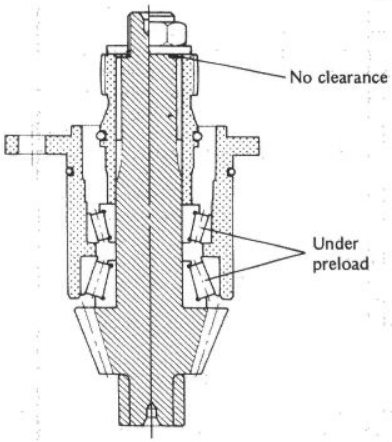
Preloading Bearings

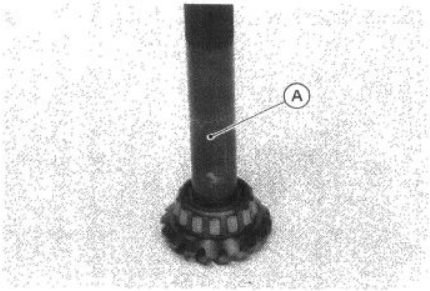
(A) Before tightening



1. Washer
2. Shim(s)
3. Pinion gear joint
4. Bearing housing
5. Tapered roller bearing
6. Tapered roller bearing

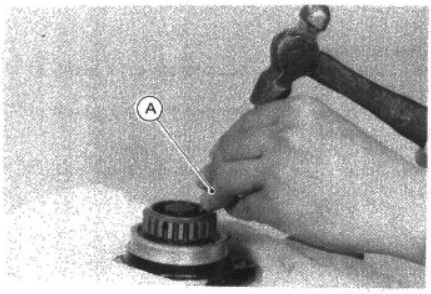
(B) After tightening





A. Bearing Driver: 57001-382

- Check and adjust the preload of the tapered roller bearing if necessary (see Front Driven Gear Bearing Preload Adjustment).
- Check the oil seal (see Oil Seal Inspection).
- Using the bearing driver set (special tool: 57001-1129), press the oil seal in until the face of the seal is level with the end of the bearing housing hole.
- Check the O-ring in the driven gear joint for any kind of damage, and replace it if necessary.
- Tighten the driven gear bolt to the specified torque (see Exploded View).
- Stake the driven gear bolt to prevent it from loosening.



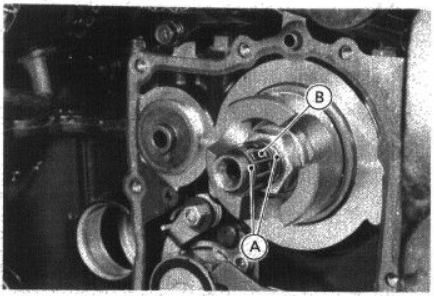
A. Stake the Bolt.

CAUTION

○When staking the bolt, be careful not to apply shock to the driven shaft bevel gear and their bearings. Such a shock could damage the driven shaft and/or bearings.

Damper Cam Removal/Installation Notes

- Remove the retainers and needle bearing.



A. Retainers B. Needle Bearing

- Holding the damper cam with the damper cam holder (special tool: 57001-1025), unscrew the damper cam nut.
- Inspect the damper cam (see Damper Cam Inspection).
- When installing the damper cam, tighten the damper cam nut to the specified torque (see Exploded View).
- Inspect the needle bearing for any kind of damage, and replace it if necessary.

Front Driven Gear Bearing Preload Adjustment

Preload Measurement:

- Adjust the bearing proload in the following cases.
  - ○When one or both of the tapered roller bearings, bearing housing, and driven shaft bevel gear are replaced with new ones.
  - ○When the driven gear bolt is loosened.
- Assemble the driven shaft bevel gear assembly, and tighten the drive gear nut to the specified torque (see Exploded View). Do not install the oil seal until the correct bearing preload is obtained.

CAUTION

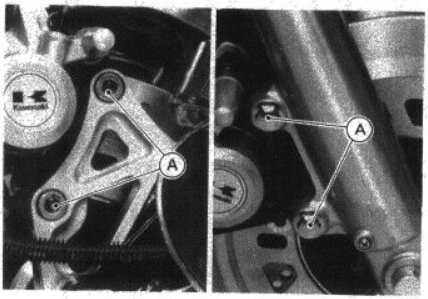
○To start with, choose a shim or shims so that the bearings are just SNUG with NO play but also with NO preload.

○Any over-preload on the bearings could damage the bearings.

- Apply a little engine oil to the bearings, and turn the gear shaft more than 5 turns to allow the bearings to seat.
- Measure the bearing preload. Bearing preload is defined as the force or torque which is needed to start the gear shaft turning.

NOTE

○Preload can be measured either with a spring scale or a beam-type torque wrench. When measured with a spring scale, the preload is designated by force (N, kg), and when measured with a torque wrench, it is designated by torque (N-m, kg-m, in-lb).



A. Mounting Bolts

★If the caliper is to be disassembled after removal and if compressed air is not available, remove the piston using the following two steps before disconnecting the brake hose from the caliper.
○Remove the pads (see Pad Removal).
○Pump the brake lever to remove the caliper piston.
○Immediately wipe up any brake fluid that spills.
●Remove the brake hose from the caliper.

Brake Pads

Lining Wear

The following specifications are only those which are unique to the ZL900-A1 model only. For all other data refer to the base manual.

Pad Lining Thickness

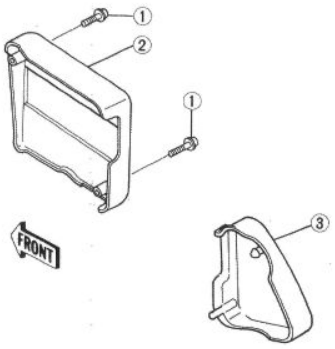
Standard	**5 mm**
Service Limit	**1 mm**

Master Cylinders

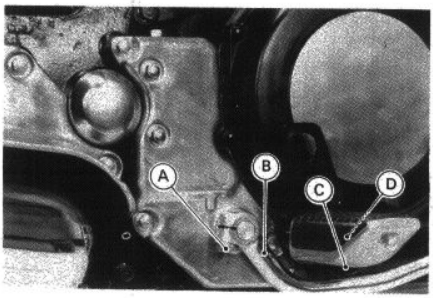
Rear Master Cylinder Removal

●Remove the following parts before rear master cylinder removal.
Reservoir cover
Battery cover mounting bolts
Battery cover
Battery
Brake pedal clamp bolts
Brake pedal
Right footpeg bracket mounting bolt
Right footpeg bracket with right footpeg
Rear master cylinder mounting bolts (loosen)
Rear master cylinder cover mounting bolts
Rear master cylinder cover

Right Side Cover



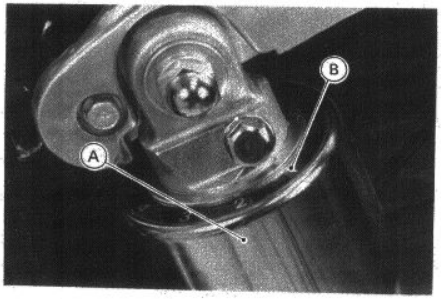
1. Battery Cover Mounting Bolt
2. Battery Cover
3. Reservoir Cover



A. Brake Pedal Clamp Bolt
B. Brake Pedal
C. Right Footpeg Bracket Mounting Bolt
D. Right Footpeg Bracket

Damping Force Adjustment

- Turn the adjuster to the desired number until you feel a click. The numbers on the adjuster show the setting position of the damper.
- Be sure to turn both adjusters to the same setting position.



A. Damper Adjuster B. Position Number

WARNING

○If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

NOTE

○The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding, or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table:

○The recommended setting position is the No. 1 position for one rider with no accessories.

Damper Force

Setting Position	Damping Force	Setting	Load	Road	Speed
1		Soft	Light	Good	Low
2		↑	↑	↑	↑
3		↓	↓	↓	↓
4	Stronger	Hard	Heavy	Bad	High

Rear Shock Absorber Removal

- Position the motorcycle across a hoist to lift the rear wheel off the floor.

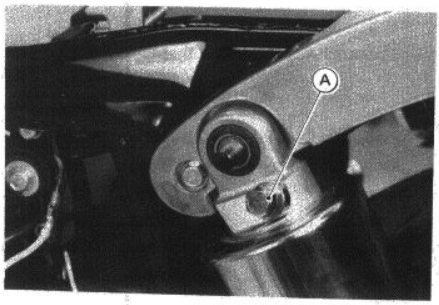
CAUTION

○Do not place any type of stand under the exhaust power chamber. This could damage the chamber.

- Remove the nuts, lockwashers, and flat washers from both ends of the shock absorber.
- Pull off the rear shock absorber.

Rear Shock Absorber Installation Note

- Install the shock absorber with the air valve cap facing outward.



A. Air Valve Cap

- Tighten the upper and lower mounting nuts to the specified torque (see Exploded View).

Rear Shock Absorber Inspection

Since the rear shock absorbers are sealed units which cannot be disassembled, only external checks are necessary.

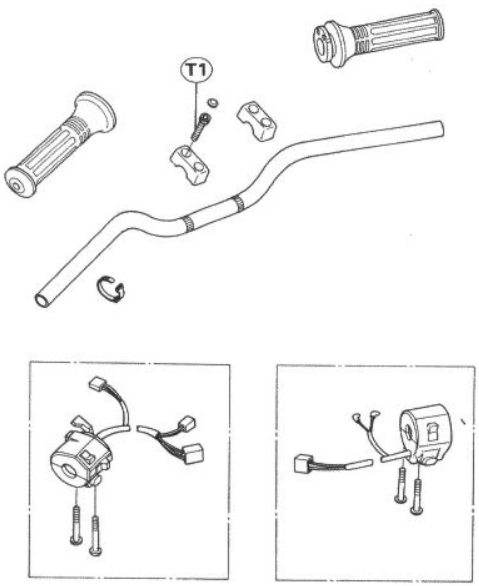
WARNING

○If one unit is damaged, replace both shock absorbers as a set. If only one unit is replaced and the two are not balanced, motorcycle instability at high speeds may result.

- Check the rubber bushings.

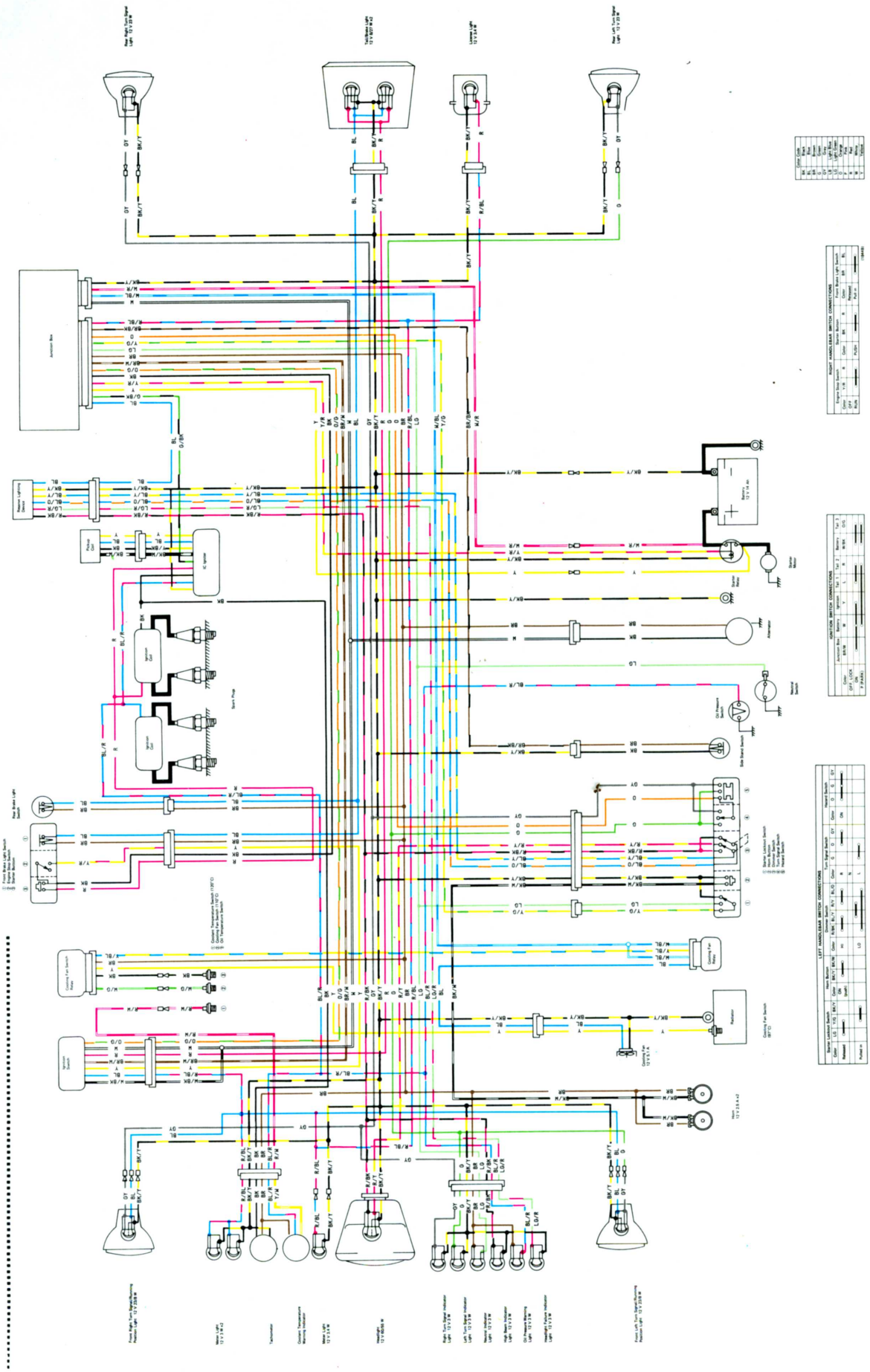
★Replace any that are worn, cracked, hardened, or otherwise damaged.

Exploded View

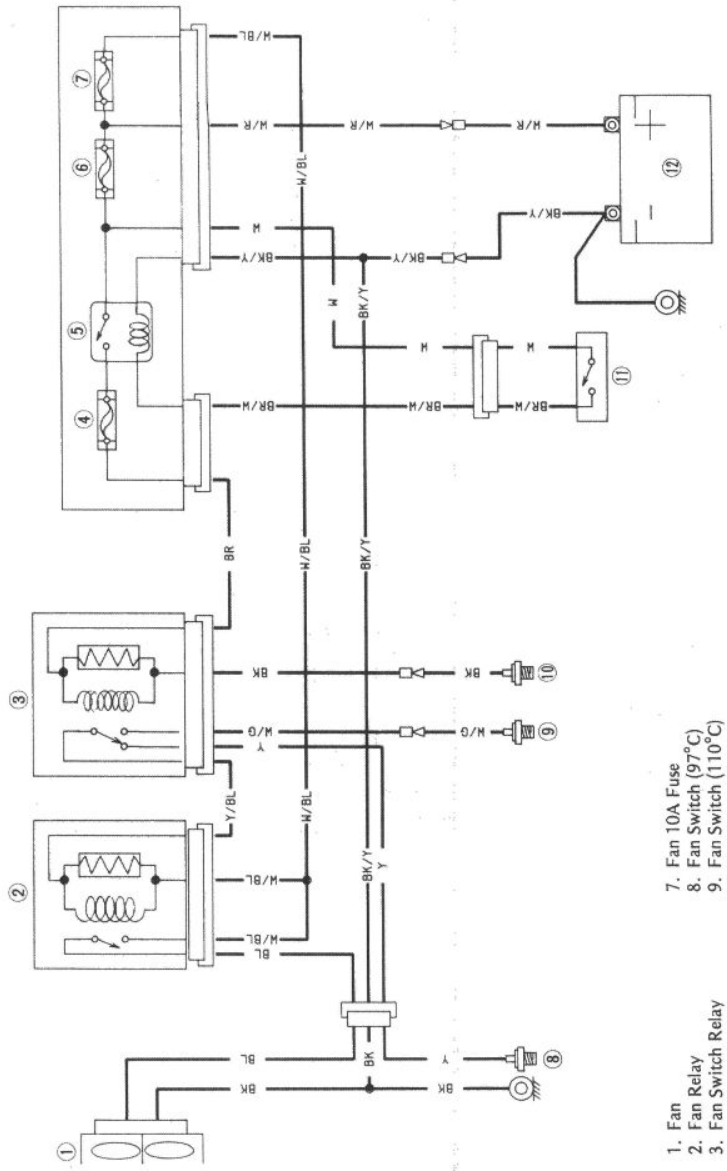


T1: 23 N-m (2.3 kg-m, 16.5 ft-lb)

ZL900-A1/A2 Wiring Diagram



Cooling Fan System



Cooling Fan System Wiring

Troubleshooting Guide

NOTE

This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Starter lockout or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter motor clutch trouble

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Alternator shaft bearing seizure
- Balancer bearing seizure

No fuel flow:
- Fuel tap vacuum hose clogged
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle fully open to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or side stand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
- IC igniter trouble
- Carburetors not synchronizing
- Vacuum piston doesn't slide smoothly
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging
- Air suction valve trouble
- Vacuum switch valve trouble

Poor Running or No Power at High Speed:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap shorted or not in good contact

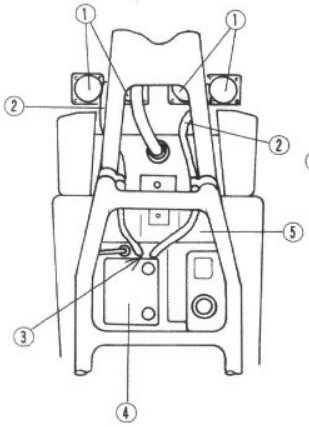
Items			ZL1000-A1
Drive Train:			
Primary reduction system:	Type		Gear
	Reduction ratio		1.732 (97/56)
Clutch type			Wet multi disc
Transmission:	Type		6-speed, constant mesh, return shift
	Gear ratios:	1st	2.800 (42/15)
		2nd	2.000 (38/19)
		3rd	1.590 (35/22)
		4th	1.333 (32/24)
		5th	1.153 (30/26)
		6th	1.035 (29/28)
Final drive system:	Type		Shaft
	Reduction ratio		2.994 (16/19 x 32/9)
	Overall drive ratio		5.371 @Top gear
Final gear case oil:	Type		API GL-5 Hypoid gear oil SAE 90 (above 5°C) SAE 80 (below 5°C)
	Capacity		220 mL
Frame:			
Type			Tubular, double cradle
Caster (rake angle)			29°
Trail			102 mm
Front tire:	Type		Tubeless
	Size		100/90-18 56H
Rear tire:	Type		Tubeless
	Size		160/80-15 74H
Front suspension:	Type		Telescopic fork (pneumatic)
	Wheel travel		150 mm
Rear suspension:	Type		Swing arm (pneumatic)
	Wheel travel		110 mm
Brake type:	Front		Dual disc
	Rear		Single disc
Electrical Equipment:			
Battery			12 V 14 Ah
Headlight:	Type		Semi-sealed beam
	Bulb		12 V 60/55 W (quarts-halogen)
Tail/brake light			12 V 8/27 W x2
Alternator:	Type		Three-phase AC
	Rated output		25 A @6,000 r/min (rpm), 14 V
Voltage regulator:	Type		Short-circuit

Specifications subject to change without notice, and may not apply to every country.

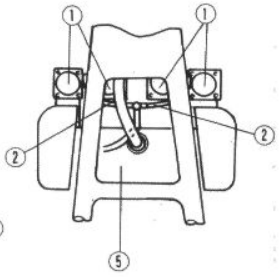
Ⓒ : Canadian Model
Ⓒal: Californian Model

Carburetor Air Breather Hose Routing

Other than Californian Model



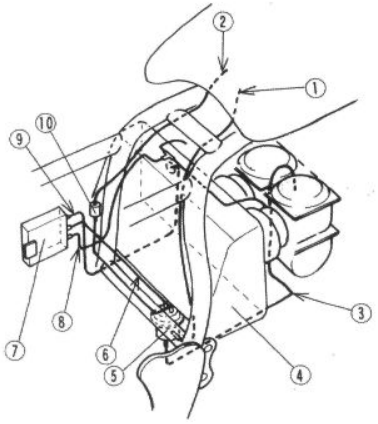
Californian Model



1. Carburetor
2. Air Breather Hose
3. Rout the hoses between the air cleaner housing and battery case.
4. Battery
5. Air Cleaner Housing

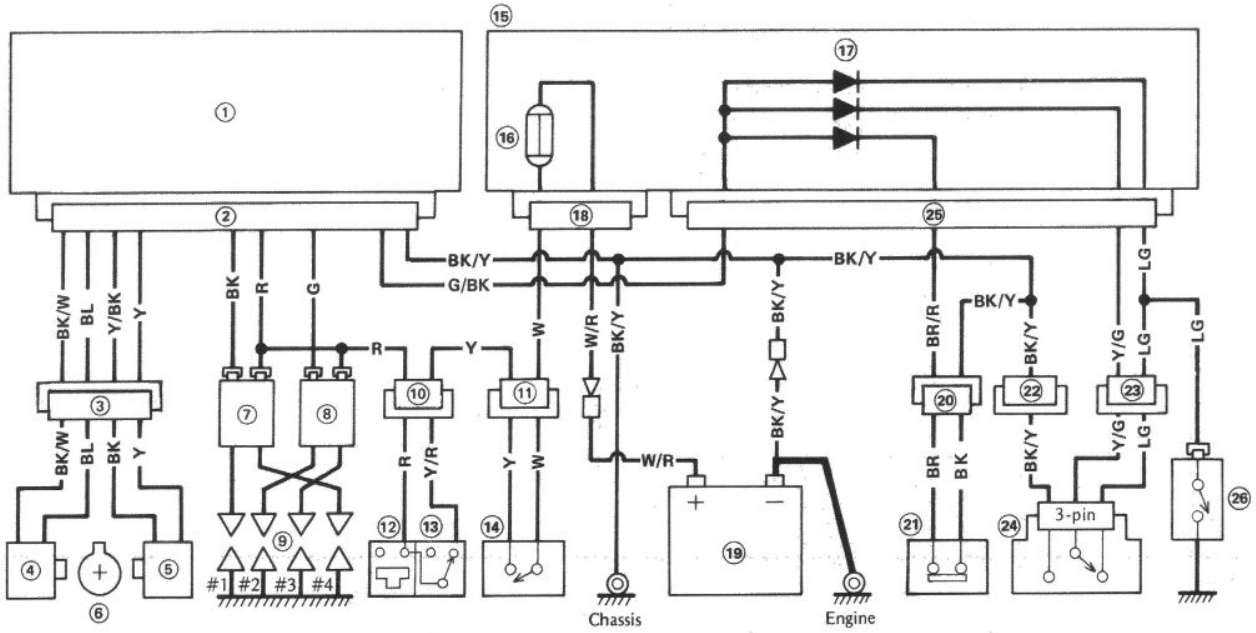
Evaporative Emission Control System

Hose Routing



1. Fuel Return Hose (Red)
2. Breather Hose (Blue)
3. Vacuum Hose (White)
4. Air Cleaner Housing
5. Liquid/Vapor Separator
6. Breather Hose (Blue)
7. Canister
8. Breather Hose (Yellow)
9. Purge Hose (Green)
10. One-way Valve

Ignition System Wiring Diagram



1. IC Igniter
2. IC Igniter 10-pin Connector
3. Pickup Coil 4-pin Connector
4. Pickup Coil for #2 and #3 Cylinder
5. Pickup Coil for #1 and #4 Cylinder
6. Timing Rotor
7. Ignition Coil for #1 and #4 Cylinders
8. Ignition Coil for #2 and #3 Cylinders
9. Spark Plugs
10. Engine Stop Switch 4-pin Connector (US Model : 6-pin Connector)
11. Ignition Switch 9-pin Connector
12. Starter Button
13. Engine Stop Switch
14. Ignition Switch
15. Junction Box
16. 30 A Fuse
17. Diodes
18. Junction Box 8-pin Connector
19. Battery
20. Side Stand Switch 3-pin Connector
21. Side Stand Switch
22. LH Switch 9-pin Connector
23. Starter Lockout Switch 2-pin Connector
24. Starter Lockout Switch
25. Junction Box 14-pin Connector
26. Neutral Switch